



**U.S. Department of Energy**  
**Office of River Protection**

**P.O. Box 450**  
**Richland, Washington 99352**

01-OSR-0305

Mr. Ron F. Naventi, Project Manager  
Bechtel National, Inc.  
3000 George Washington Way  
Richland, Washington 99352

Dear Mr. Naventi:

CONTRACT NO. DE-AC27-01RV14136 - TOPICAL MEETING MINUTES FROM JULY 24, 2001


Enclosed please find the meeting record of the July 24, 2001, Topical Meeting between the Office of Safety Regulation and Bechtel National, Inc. If you have comments or questions regarding the meeting record, please contact me or George Kalman of my staff, (509) 372-0652. Nothing in this letter should be construed as changing the Contract, DE-AC27-01RV14136. If, in my capacity as the Safety Regulation Official, I provide any direction that your company believes exceeds my authority or constitutes a change to the Contract, you will immediately notify the Contracting Officer and request clarification prior to complying with the direction.

Sincerely,

Robert C. Barr  
Safety Regulation Official  
Office of Safety Regulation

OSR:GK

Enclosure

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## Meeting Record

IMS: 01-OSR-0305

MEETING PURPOSE: The 23<sup>rd</sup> Topical Meeting between the Office of Safety Regulation (OSR) and Bechtel National, Inc. (BNI): Vertical Slice of Preliminary Safety Analysis Report (PSAR) using Pilot Design Basis Event (DBE)

MEETING DATE/TIME: July 24, 2001/1:00 – 4:00 PM

MEETING PLACE: Room 1305, 2440 Stevens, Richland, WA

AGENDA:

1. OSR Opening Remarks
2. BNI discussion of Vertical PASR Slice and Pilot DBE

ATTENDEES: See Attachment 1


PREPARED BY: Ko Chen

CONCURRENCE: George Kalman

### KEY DISCUSSION ITEMS:

The meeting began with a welcome from the Office of Safety Regulation (OSR), the introduction of attendees (Attachment 1) and a review of the meeting agenda. The OSR reiterated that the purpose of topical meetings is to resolve regulatory issues in advance of the submittal of the construction authorization request (CAR) for the River Protection Project-Waste Treatment Plant (RPP-WTP) to facilitate a timely review of the CAR. The topical meeting protocol is described in Attachment 2. The OSR emphasized that the public is welcome to observe topical meetings. However, only representatives from other regulation agencies, such as the State of Washington or Defense Nuclear Facility Safety Board (DNFSB), can participate in discussions during the meetings. The OSR also noted that both OSR and Bechtel National, Inc., (BNI) had deviated from the meeting protocol by missing submission dates for meeting minutes and pre-meeting supporting documentation during the past month.

Additionally, the OSR noted that the goal during topical meetings is to reach resolution on the various issues on the agenda. Three BNI initiatives that were proposed during the June Topical Meeting had not been resolved. OSR stated that resolution of these issues is ongoing and is

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expected to be finalized in the next two weeks. Specifically, the three issues include BNI proposals to:

- Modify the Integrated Safety Management (ISM) process to support procurement of long lead items
- Combine the Hazard Analysis Report (HAR) and PSAR
- Segment the PSAR submittal and obtain early DOE authorization for selected civil construction activities before completing the PSAR process.

The status of open issues from past topical meetings was reviewed and included: 10 of 133 issues that were identified during the review of the Initial Safety Assessment Report (ISAR), 66 topical meeting action items, and 14 significant unresolved issues. Seventeen topical meeting action items were closed during the June 2001 topical meeting. (Note: Status and identification of open issues are documented in an OSR memorandum from George Kalman to D. C. Gibbs, OSR, "Status of Topical Meeting Open Issues at BNFL Contract Termination," 01-OSR-0001, dated October 5, 2000, and updated in OSR letter from W. J. Taylor/D. C. Gibbs to Ron F. Naventi, BNI, "OSR Disposition of CHG Request to Close out Initial Safety Assessment Report (ISAR) Open Items," 01-OSR-0088, dated March 14, 2001.)

In transitioning to the BNI agenda for this topical meeting, the OSR identified the pre-meeting activities that occurred to prepare for the meeting. These pre-meeting activities are identified in Attachment 2 and include document submittals and working meetings.

### BNI Presentation


After this introduction by the OSR, the BNI portion of the meeting began. BNI stated that the purpose of this topical meeting was the following:

- Demonstrate the application of the ISM process in DBE selection and accident analysis.
- Provide a prototype PSAR example to demonstrate the expected level of detail in the CAR submittal.
- Demonstrate that the PSAR addresses the OSR's RL/REG-99-05, *Review Guidance for the Construction Authorization Request (CAR)*.
- Obtain feedback and identify issues.

The BNI agenda is included in Attachment 3.

### The BNI Vertical PSAR Slice and Pilot DBE Scope (Pages 4 to 8 of Attachment 3)

BNI stated that the objective of the pilot DBE was to demonstrate processes that would develop the accident analysis, controls and SSC standards. The vertical slice would combine the accident analysis with the PSAR text to provide an example of the level of detail that would be included in

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the PSAR. A liquid spill from a high level waste (HLW) facility concentrate receipt tank was used by BNI as the example pilot DBE for the vertical PSAR slice. BNI stated that the PSAR sections to support the related HLW requirements and SSCs for this specific DBE include:

- Chapter 2 Facility Description Discussion
- Chapter 3 Hazards and Accident Analysis
- Chapter 4 ITS SSCs
- Chapter 5 Technical Safety Requirements

The above chapter numbers refer to a Construction Authorization Request format informally proposed by BNI that is intended to parallel the format of DOE-STD-3009.


The OSR made a general observation that based on the information provided by BNI the PSAR sample did not appear to include sufficient information to constitute acceptable detail for a PSAR. If a PSAR were submitted that included a level of detail similar to the sample, the document would be returned to the Contractor as unacceptable. BNI concurred that the sample slice of the PSAR required additional work and characterized it as a work in progress.

#### PSAR Vertical Slice DBE Analysis (Pages 9 to 28 of Attachment 3)

For the HLW vitrification facility, BNI stated that the DBE review was completed on May 1, 2001, the standard identification process database (SIPD) review was completed on May 5, 2001, and the C5 system on June 27, 2001. A DBE/ISM review meeting to confirm action item resolution from previous reviews will take place during the week of August 6, 2001. A SIPD revision meeting is planned on August 15, 2001, and a meeting to update design media will be held on September 30, 2001. The objectives of all these meetings are described in Attachment 3. BNI stated that its PSAR vertical slice DBE analysis included the following information:

- Hazard Evaluation
- DBE Selection
- Accident Scenario Development
- Source Term Analysis
- Consequence Analysis
- Comparison to Radiation Exposure Standards (RES)
- Preventive/Mitigative Functions
- Mitigated Consequence Analysis
- C5 Reliability Modeling
- Safety Requirements Documents (SRD) Defense-in-Depth Compliance
- Safe State Compliance
- Uncertainty Analysis.

The BNI selection process for HLW vitrification facility DBEs is described on pages 15 to 19 of


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Attachment 3. BNI indicated that the selection process resulted in 12 credible liquid spill DBEs with consequence of either severity level (SL)-1 or SL-2. The example for this PSAR vertical slice DBE analysis is a liquid spill from the HLW facility concentrate receipt tank. The condition of this tank is described on page 18 of Attachment 3. The source term for this analysis, the consequence analysis, preventive/mitigative functions for this DBE are detailed in Attachment 3 (pages 24 to 28).

Based on the review of the topical meeting submittal, the OSR questioned what "failure frequency" meant for a postulated unmitigated event, and what relevance "unmitigated failure frequency" might have on the accident analysis methodology. BNI responded that the same material selection criteria, industry standards, codes, and inspection practices will be applied to any tank regardless of whether the evaluation is considered mitigated or unmitigated. The BNI response is detailed on pages 20 to 23 of Attachment 3. OSR noted that there appeared to be confusion associated with how unmitigated events are used in the ISM analysis and that clarification of this issue is needed.

The following is a summary of verbal exchanges between the OSR and BNI on this subject. OSR comments and questions are followed by the BNI responses:

- What is the basis for the selected parameters (solid contents, density pH, etc.) to describe the condition of HLW concentrate receipt tank as listed on page 18 of the Attachment? The selection is based on values consistent with the process for filling a canister to the maximum allowable heat loading.
- Is there any impact from the pretreatment facility and low level waste (LAW) vitrification facility on the HLW DBE selection process? None.
- How are representative events defined? Those are defined as the events posing the most challenging conditions to the SSC performance requirements.
- Are inspections of the HLW concentrate receipt tank anticipated? No. The tank is not accessible.
- The OSR emphasized that it was inappropriate to compare unmitigated consequences with the mitigated consequence calculations associated with the radiation exposure standards (RES). The methodology for these calculations is completely different, "frequency" considerations are not used in unmitigated consequence calculations. The purpose of the RES is to approximately assess the effectiveness of preventative and mitigative control strategies. The purpose of unmitigated consequence calculations is to assign severity levels to events and establish a target frequency for the corresponding mitigated event.
- What is the difference between control strategy elements and safety case requirements (SCR)? Control strategy elements are derived from the ISM process. SCR are defined as SSCs performance requirements.

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### HLW C5 System Reliability Modeling (pages 29 to 41 of Attachment 3)

BNI stated that the C5 ventilation system is designed to aid in the confinement of contamination sources, remove airborne particulate from the discharge air, and maintain room temperature. Supply air cascades to the C5 area from the adjacent C2 and C3 areas through in-bleed units and cell or cave penetrations. The air is exhausted to the stack by the C5 exhaust fans. The C5 system description is detailed on pages 30 and 31 of Attachment 3. The objective of the HLW C5 reliability modeling is to estimate the probability of failure of HEPA filters and the resulting loss of the C5 decontamination factor (DF) for various C5 system failure modes. The calculated result is shown on page 36 of Attachment 3. This failure mode is a rupture of 1 of 5 primary filters plus a leak in 1 of 5 secondary filters, resulting in a DF of 167. Based on the result, BNI stated that C5 system reliability is adequate assuming the dependency of dampers on instrument air is resolved. The existing design includes air-activated dampers that fail closed on loss of air pressure. The air supply to the dampers is not important to safety (ITS). BNI indicated that potential solutions to the air dependency are use of motor operators in lieu of air operators or use of local backup air reservoirs for the dampers.


BNI presented information (p. 37 of handout) on system reliability and on the assignment of uncertainty (p. 41 of handout) using Monte Carlo techniques. BNI indicated that Monte Carlo techniques were used to estimate the safety margin in both the bounding unmitigated calculations and the conservative mitigated calculations. BNI explained that the bounding unmitigated calculations are performed to determine the severity level of an accident sequence while the conservative mitigated calculations are performed to demonstrate conformance to the RES dose standards. The OSR indicated that the use of Monte Carlo techniques in bounding unmitigated calculations is misleading and inconsistent with the BNI methodology for dose calculations and therefore not appropriate. The OSR also indicated that other techniques are available for estimating the safety margin contained in the conservative mitigated calculations. It was further pointed out the BNI dose methodology does not include a description of the Monte Carlo techniques as used in conservative mitigated calculations. It was concluded that this matter requires additional attention and follow-up discussions between the OSR and BNI.

### ISM/DBE Input to Design (Pages 43 to 45 of Attachment 3)

BNI stated that the ISM Safety Case Requirements drive:

- Required SSCs
- SSC safety classifications and quality levels
- Design requirements
- Design features
- Standards.

BNI provided a sketch of derived SCRs for related SSCs of this DBE example (shown on page 45

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of Attachment 3).

The OSR pointed out that the sketch provided some useful information on the SCR. However, the sketch alone is not sufficient for a technical review by the OSR. A process and instrumentation (P&I D) diagram with all the mitigating features on it should have been provided.

PSAR Matrix to address 99-05 (Pages 46 to 51 of Attachment 3)

BNI stated that its PSAR submittal will address the CAR review acceptance criteria listed in RL/REG 99-05 by creating a matrix to RL/REG 99-05 review criteria.

BNI provided a matrix example to illustrate how the proposed PSAR sections would address review guidance from RL/REG 99-05. This material is included on pages 48 to 51 of Attachment 3. OSR observed that the matrix was not sufficiently detailed to permit efficient review of the proposed PSAR format.

The following is a summary of verbal exchanges between the OSR and BNI on this subject. OSR comments and questions are followed by the BNI responses:


- Will the elements of defense-in-depth be discussed in the PSAR? This would be done in a specific subsection for each SSC.
- Will BNI incorporate design basis and safety and regulatory information in an electronic database as is being done at most commercial nuclear power plants? BNI will use a three-dimensional electronic process to record the design. There was no response on whether this process can also accommodate design basis and safety and regulatory information.
- What will be in the PCAR? The PCAR will include information needed for approval of the basemat and “walls to grade” for the HLW and LAW facilities. The PCAR will be folded into the PSAR when the PSAR is submitted. Eventually, one PSAR will be kept for the project.

The OSR Evaluation of the Meeting

At the conclusion of the meeting, the OSR Safety and Standards Review Official commented that the BNI presentation of the sample DBE lacked sufficient detail. A PSAR submittal based on the example presented at the topical meeting would fail the OSR acceptability screening and would be returned to the Contractor. Specific OSR comments would be forwarded to the Contractor for use as guidance in developing the PSAR (these comments are included in attachment 4).

**INFORMATION EXCHANGES**

1. The OSR meeting presentation material
2. BNI handout on Vertical PSAR Slice and Pilot DBE

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ATTACHMENTS:

1. The meeting attendance list
2. The OSR Meeting Presentation Material
3. BNI handout on Vertical PSAR Slice and Pilot DBE
4. OSR comments on PSAR Vertical Slice